

## **Legumes & Profit**

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Key Messages:

- 1) Know your own enterprises margins;
- 2) Decide based on profit, not emotion;
- 3) Encourage industry research into legumes;

There are an often heated discussions about the place of legumes in rotations in farming businesses all over Australia.

This might be useful to give an overview of how the legume choice meets with financial benefits and/or consequences.

### **Background**

The industry is encouraging the use of legumes. Instinctively we WANT to use legumes in our farming systems.

- 1) Legumes are better for soils;
- 2) Legumes provide nitrogen;
- 3) Less expenditure on input costs could mean lower risk;
- 4) Legumes may provide different agronomic options for weed control;

At a recent GRDC update in Corowa, NSW there was a really good long term scientific analysis of how legumes are good for soils.

The difficulty for you as a grower is where this desire to grow legumes meets the economic impact of this decision on your farming system. If you measure this impact accurately, you will have an informed view of the best options for your business.

### **Scenarios**

We present below three scenarios for you to consider in this discussion on legumes on your farm. You need to know which scenario matches the major soil types on your farm

1. The scenarios are based on the farm operating profit for enterprises. Our profit figure includes all variable and overhead costs except finance costs.
2. The 'Legume' scenario could be any of the legume crops or livestock/pasture enterprises.
3. Take a long-term view. Calculate the actual results for the past 5 years as a guide but don't rely on history alone to be your guide. Form a view of commodity prices to combine with history and arrive at a 'considered' view of the rotational options.

It is often not wise to look at short term price signals (low wheat/barley prices OR high sheep/wool prices!) You want to make good long term decision. This is quite different from a short-term decision that you can make on a seasonal basis with more influence from the pricing, soil moisture and time of sowing factors.

## Scenario 1

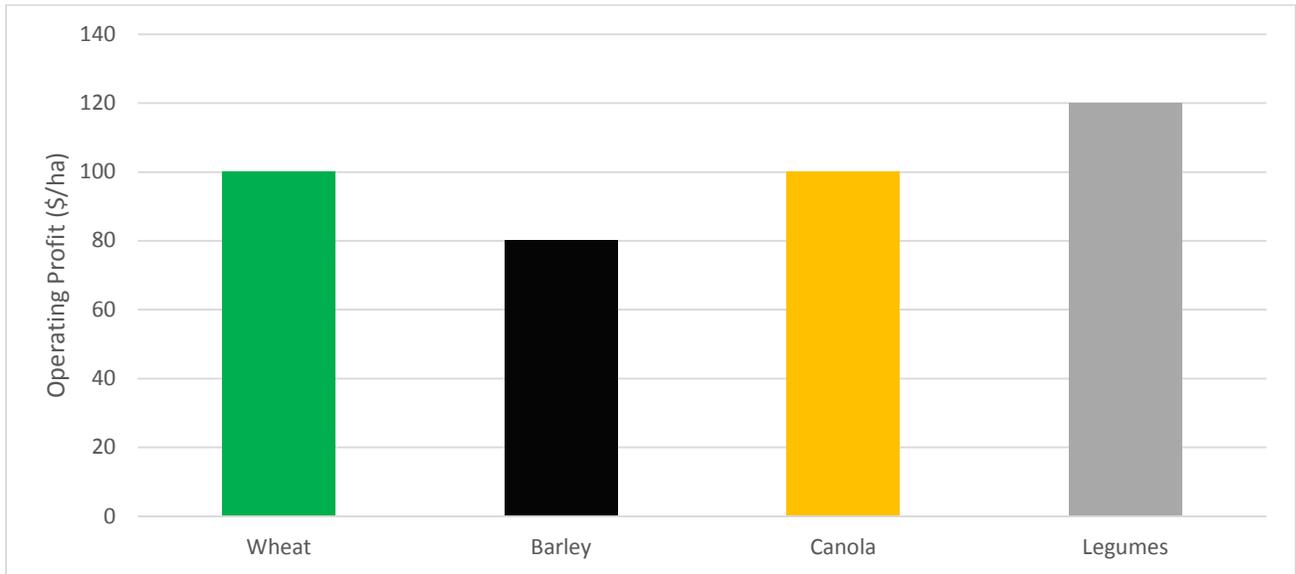


Figure 1: Profitable Legumes

A profitable legume enterprise – the envy of most dryland arable farmers in the country.

Examples of this include some areas of Southern Victoria and South Australia who have a great track record of growing crops such as lentils. For some of these businesses, non-legume crops are seen as the break crop and legumes often make up 50% of a cropping program.

Many high rainfall areas right across the country are seeing this with sheep enterprises with a strong rise in sheep and wool prices. Generally, this is more profitable in areas where soil types can sustain solid stocking rates over a long period of time.

For the first time in more than 20 years, some high rainfall (>450mm) farming areas have made the call to expand (or in some cases re-establish) sheep enterprises because this enterprise, at current prices, can provide a profitable legume option. Re-establishment costs of sheep enterprises can be significant, so be sure to take into account the capital costs of this option.

## Scenario 2

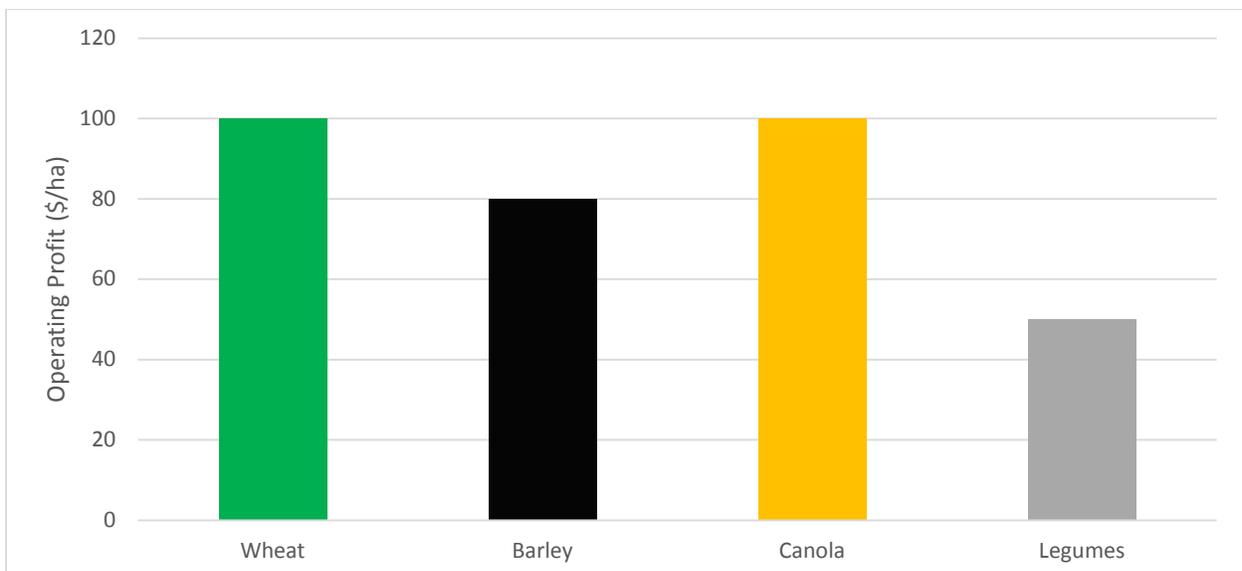


Figure 2: Marginal Legumes

This scenario is more common in the medium rainfall areas of the country (<450mm). Rainfall is generally not high enough for many legume options to be very profitable.

Examples of successful legumes in these areas include lupins, peas, faba beans, vetch hay, chick peas.

The legume enterprise may still make a profit, but it is generally less than cereal and canola enterprises. In this situation you may consider growing legumes, generally not more than 33% of the arable area because of the lower profitability and often higher production risks such as frost or dry finishes.

Quite often the decision to be made is a choice between legumes and canola. In this zone, canola can provide many of the break crop advantages while also producing a profit.

There are lots of studies in most areas showing long term trials that can enable you to establish the difference in yields for example in wheat following lupins or canola.

Many growers have differing view and experiences. For some, their wheat following canola, yields as well as their wheat following legumes. Some growers believe that their wheat following legumes is 200kgs better than wheat following canola. On rare occasions, some believe it is 500kgs or more per hectare better.

The following table is taken from a project carried out by the CSIRO which Farmanco contributed data to. It is based on a study of 971 paddocks from 49 farms over a period of 10 years from 1997 to 2007.

Rotation	Yield of (W*)	Wheat Yield Boost in kg/ha over WWW	Value of the Yield Boost with Farm Gate Wheat Price of \$250/t (\$/ha)	Cost Saving In Nitrogen at \$1.10 per kg of N (\$/ha)	Cost Saving in Herbicides and Fungicides (\$/ha)	Benefit of Rotation (\$/ha)	Operating Profit needed in Break Crop to Match WWW (\$/ha)
WWW*	1.82 t/ha	0 kg	\$0.00	\$0.00	\$0.00	\$0.00	\$125.00
LW*	1.98 t/ha	160 kg	\$40.00	\$33.00	\$20.00	\$100.00	\$25.00
LWW*	1.85 t/ha	30 kg	\$7.50	\$16.50	\$10.00	2 <sup>nd</sup> Yr of \$32.50 + 1 <sup>st</sup> Yr of \$100.00	-\$7.50
PW*	1.98 t/ha	160 kg	\$40.00	\$27.50	\$20.00	\$87.50	\$37.50
CnW*	1.98 t/ha	160 kg	\$40.00	\$0.00	\$20.00	\$60.00	\$65.00

Table 1: The Operating Profit you need to achieve in the Break Crop to match the three Wheat (WWW) Rotation

- Source "Using industry information to obtain insight into the use of crop rotations in the Western Australian wheat belt and quantifying their effect on wheat yields" (2010) Roger Lawes CSIRO.

This shows that over a long period of time, the yield rotational benefit in favour of wheat in the central wheatbelt of WA, is statistically insignificantly different between lupins and canola.

The vast majority of this yield benefit is driven by improved nutrition, predominantly Nitrogen (N). In some soil types the additional N supply from a legume can be as low as \$20/ha to as high as \$50/ha. In most medium rainfall zones this is rarely much above \$40/ha.

From the financial perspective you can add this cost benefit onto the legume profitability. This closes the gap in profitability and enables you to make a long term decision based about the percentage area of legumes. In doing this, you maintain profitability but you also get the long term benefits to the soil.

There are other rotational benefits. They are certainly not as large or repeatable as the nutritional benefit at this stage. The most obvious cost savings are reduced need for fungicides in the first cereal crop after a pasture or breakcrop, and sometimes there will be savings in grass selective herbicide costs.

The difference in profitability between enterprises and the different risk profile of these enterprises will ultimately determine how much you are comfortable to grow – hence your legume percentage might vary between 20% and 40% depending upon soil type and rotation.

### Scenario 3

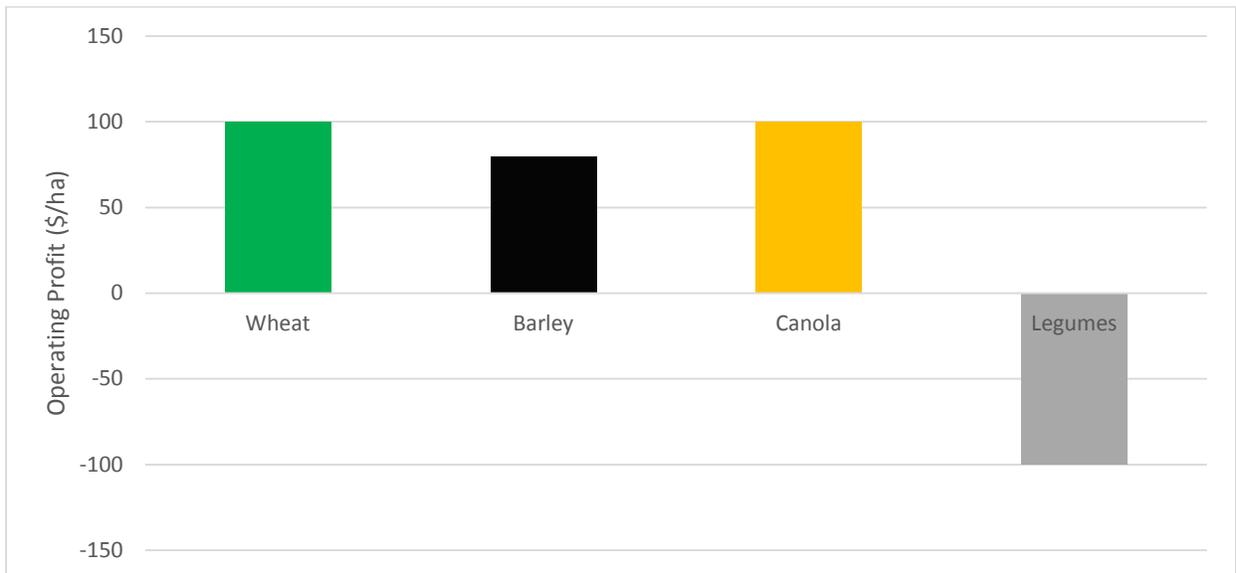


Figure 3: Unprofitable Legumes

More than 50% of Australia's dryland crop growing area (<350mm) does not have a profitable legume option – yet? You need to know if this large negative is the situation in your business in terms of the legume alternatives.

In our benchmarking service of nearly 300 clients, with an average dryland arable farming area of 4,500 arable hectares, the choice to grow 25% legumes rather than canola, for example, in this scenario will cost you something like \$200/ha less the nitrogen benefit of say \$40/ha or \$180k in profit per year and represents over 30% of annual profit.

In some businesses the differential profit is much larger and in some it is much less. You need to know your own numbers here and they are not hard to work out.

## **Evidence**

There is no evidence yet, to our knowledge of a real decline in profitability for farm businesses that have no legumes. We take the pragmatic view that the additional annual profit will place the business in a better position to expand than its neighbours. If we start to see a fundamental decline in productivity, we can always go back to a legume system, funded by the profit saved in the previous period.

I have been looking hard at continuous wheat/canola programs as these systems, some of which have been running for 15 years, are likely to show up issues first. At this stage there are no obvious signs of declining yield or profitability trends. There may be sub-clinical things going on, but they are certainly not painful financial experiences at this stage that would encourage a return to legumes.

## **Other Factors**

There are always a myriad of factors to consider in your operational decisions:

- a) Legume area can be affected by logistical decisions;
- b) We know that legumes can have vast differences in performance on the right soil types and struggle on less suited soil types. Focus the rotational plan for different soil types appropriately to minimise the loss and maximise the rotational advantages.
- c) Agronomic decisions will drive some of your rotational decisions, so you need to factor this in, particularly for weed control. Be sure to consider that there is a significant advantage over a more profitable break crop option.
- d) Your choices might be between legumes and Non-Utilised Area(NUA). We generally use the term NUA to account for fallow, brown manure or green manure options. Be sure to take into account the relative yield advantages in the enterprise following the legume or fallow option and the costs associated with each alternative. Be sure to include the fixed costs on the area being fallowed. There will often be \$180/ha in costs which with a farm gate price for wheat of \$250/t is equal to an extra 720 kg/ha of yield required in the following wheat.
- e) Livestock enterprises don't suit everyone. Just because it might be profitable is not necessarily a good enough reason.

## **Emotions**

There are reports from different facets of the legume industry saying how legumes are becoming more popular.

In our benchmark data, the legume area has only seen very minor changes from year to year and certainly no significant moves to support the apparent uptake in legumes.

We try to take the emotion out of this decision by measuring that actual profit and known benefits or disadvantages. We then encourage sensible long term options that support the need to be profitable and sustainable over the long term and grow the business while meeting personal objectives.

Ultimately, it is your business. The beauty of this is that you can decide what to do yourself. Just because it isn't profitable might not be a good enough reason for you not to do it! But use good information to make an informed decision.

## Benchmarking Data (Heavy weighting on WA)

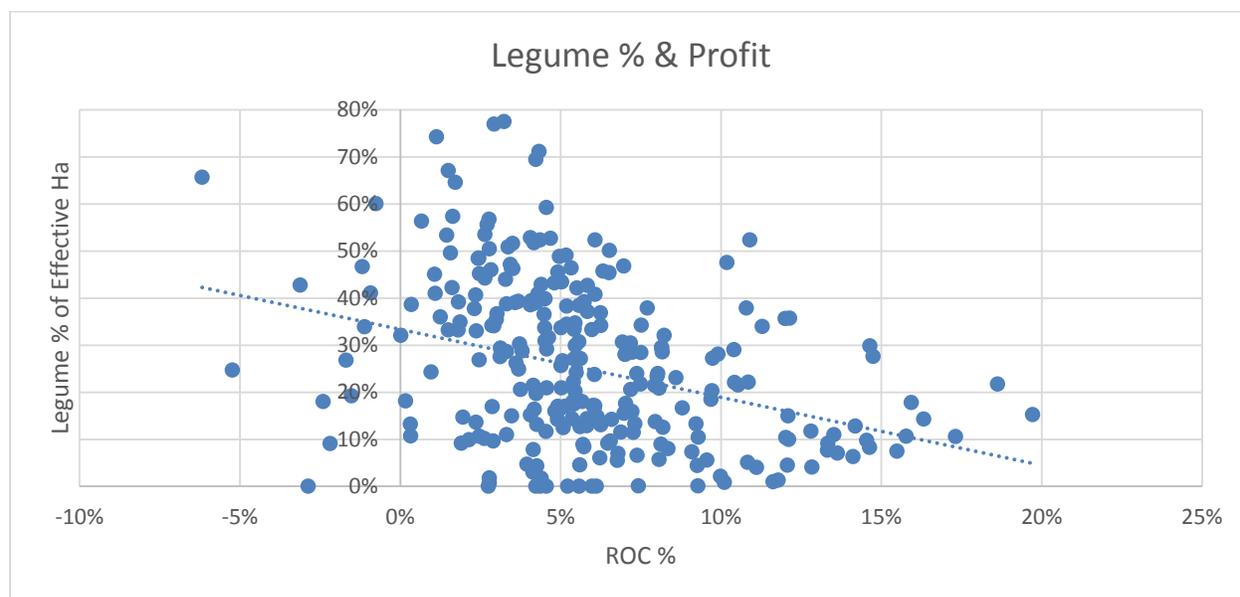


Table 2: Legume % & Profit

This is data from our Profit Series of over 280 clients over the last five years. The left axis is the percentage of legume pastures and legume crops compared to the total farm effective area, on average for the past 5 years. The horizontal axis is the 5 year average Return on Capital (ROC). The average legume area here is 25% comprised of 20% pastures and 5% legume crops on average.

In the past five years, there has been an inverse relationship between legumes and profit. This data set has a predominant focus in areas that do not have good legume options and it shows that the more legumes you have as a percentage of the total area, the less profitable you are. A key factor driving this in the past five years has been the increased profitability of canola. In the next five years, this graph may look quite different with a strong improvement in pasture profitability.

### Industry

We absolutely need to encourage on-going research. What if we were to discover a new legume for much of this area that was profitable? This would change and improve most of our farming systems significantly. Many growers are still experimenting with different legumes in different areas with the hope of cracking this 'nut' with the vision of "a profitable legume that can compete for rotation against cereals and canola." The Esperance zone has been trialling Lentils again, now with some success.

### Summary

As a consulting business, we are having these discussions with our clients every day. As our task is to try and help arrive at a sound financial and personal decision. We are often seen as being against legumes.

For the record, we would love to see legumes on every farm! It is just that the financial penalty at the current time will make some businesses unsustainable unless there are more profitable legume options. Know your own numbers and make a balanced decision which is good for your business.